AUSTRALIAN SOCIETY for LIMNOLOGY

Newsletter

Volume 11 Number 4

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AUSTRALIAN SOCIETY FOR LIMNOLOGY

NEWSLETTER

VOLUME 11 - NUMBER 4

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The Australian Society for Limnology (ASL) is an association of over 200 people with professional or amateur interests relating to Australian inland waters. Since its inception in 1961, the society has played an important role in fostering limnological work in this country. The ASL also promotes effective liaison between limnologists in academic, private, and governmental institutions, and has a vested interest in the conservation of aquatic and related resources. Annual congresses are held usually near centres of limnological interest, and the program includes scientific sessions, field excursions, and social activities.

The society publishes a Bulletin, which appears at about yearly intervals, and contains scientific articles. An informal Newsletter is distributed about four times yearly, and includes notes on activities of members, book reviews, congress announcements, and articles of general interest. Special publications also are issued, although less frequently. A further periodical publication is the Directory of Australian limnologists. All current publications are sent to financial members without additional charge. Libraries may subscribe to the Bulletin and may purchase special publications.

Membership is open to any person or organization with an active interest in Australian limnology. Four classes of subscribing membership are catered for:

(i) Ordinary members (annual subscription: $6)

(ii) Student members (annual subscription: $3)

(iii) Sustaining members (individuals, companies, or organizations contributing $50 or more annually)

(iv) Affiliated bodies (subscription determined annually)

Annual subscriptions cover the period 1 July - 30 June, and must be paid prior to 31 December. For membership enquiries, see p.2.

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MEMBERSHIP ENQUIRIES — Mr D.E. Buckmaster
Hon. Secretary-Treasurer, ASL
Fisheries and Wildlife Division
Arthur Rylah Institute

EDITORIAL NOTES

THE ASL XIII ANNUAL CONGRESS to be held in Queensland is top-of-the-bill for this issue. Information and application forms have already been distributed, but some supplementary material is included herein. Although the Congress is to be a joint meeting of three societies, the Venue Committee are most anxious that no ASL member should feel alienated. The Queensland meeting was planned as an ASL Congress, and only subsequently have the other societies become involved. By all means let's maintain the quality and quantity of contributions at past ASL meetings.

MINUTES for meetings of the Executive Committee are included; they contain several items of likely interest. In future, the Newsletter will include Minutes even when they have not yet been ratified by a subsequent meeting of the committee. In this event they will be noted as 'Draft Minutes', and ratification or otherwise will be noted in the following issue of the Newsletter. This change of policy will enable more rapid communication between the Executive and the general membership.

CONSTITUTIONAL REFORMS were mentioned in Volume 11, Number 2 of the Newsletter. One suggested involved clarification of voting rights of Student Members, and another has recently arisen: the status of Affiliated Bodies. Section 4 of the ASL Constitution requires clarification in this regard; it is not clear whether Affiliated Bodies are to be considered members of the society (although in practice they are treated as such), and it is also unclear what the distinction between Affiliated Bodies and Sustaining Members should be. In order that these and any other matters relating to the Constitution can be dealt with at the next Annual General Meeting (in May), would those members with views to express please do so at their earliest opportunity? Send your letters to the Secretary, Don Buckmaster, and he will pass them on to the Executive Committee, who plan next to meet on 29 March, in Melbourne.

THE NEWSLETTER needs a good deal more support from members. Only a very small part of this issue is material volunteered by members, and it is unfortunate that the Newsletter seems destined to become a rather dry collection of minutes and notices. Earlier issues - in the 1960's - contained many small articles of limnological interest, but this has become progressively less true in recent years. The Bulletin has not entirely supplanted this function of the Newsletter! How about it, folks?

Keith Walker
Dept. Environmental Biology, RSBS
Australian National University
Canberra, ACT 2601.

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NOTICE OF THE XIII ANNUAL CONGRESS

The XIII Annual Congress is to be held at the Noosa Lakes Motor Inn, Tewantin, Queensland, from 10 May (Friday) - 13 May (Monday), 1974. A joint meeting of ASL, the Australian Society for Fish Biology (ASFB), and the Australian Marine Sciences Association (AMSA) - with estuarine studies as the theme - will be held in conjunction with the ASL Congress. This joint meeting was arranged following a decision made at the 1973 AGM : that the ASL Executive should explore the possibilities for having all three societies meet together. It is hoped that ASL members attending the meeting will enjoy all the benefits of past conferences with the bonuses of a series of papers on estuarine systems, and the chance to confer with colleagues in ASFB and AMSA.

Information and application forms regarding the meeting have been sent to all memebrs. This circular also called for papers for the estuarine studies session. The program for the meeting is not yet finalized, but it will extend over a three day period with some of the activities generally complete on the week-end being held over until Monday. No final decision has been made concerning the field excursion, but it appears likely that members will be able to choose from a boat trip up the Noosa River and a walking excursion to the freshwater lakes in Cooloolah National Park. Other field trips may also be available.

Further information concerning the conference will be announced when it becomes available. It is hoped that a large number of limnologists will attend the 1974 Conference and that a large number of papers will be contributed to the limnological sessions. In this way we can be assured that the 1974 Conference will be as great a success as the 1973 meeting at Jamieson.

If you have any queries regarding the conference, or if you require further application forms, please write to;

Dr M.C. Geddes
Dept. of Zoology
University of Queensland
St. Lucia, Qld. 4067.

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OTHER CONFERENCE ANNOUNCEMENTS

THE INSTITUTION OF ENGINEERS, AUSTRALIA is planning an Interdisciplinary Conference on the Environment in Canberra in June 1975. Firm plans have not yet been made, but those wishing further details should write:

R.D. Henderson
Committee Secretary
The Institution of Engineers
Science House
157 Gloucester Street
SYDNEY, NSW 2000

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THE INTERNATIONAL ASSOCIATION OF WATER POLLUTION RESEARCH is to hold its VII Conference in Paris from 9-13 September 1974. Address enquiries to:

Comite Francais de la Recherche sur la Pollution des Eaux
(IAWPR - AIRPE),
C/- SOCFI
7 rue Michel Ange
F75016 PARIS
FRANCE

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A FORWOOD CONFERENCE is to be held in Canberra for five days from 1 April 1974. The Australian Government is anxious to develop a National Production Forestry Policy and, through the Australian Forestry Council, it is relying largely on the Forwood Conference to provide at least the guidelines for such a policy. Enquiries to:

The Executive Officer
Forwood Conference
C/- Forestry and Timber Bureau
CANBERRA, ACT 2600.

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SOCIETAS INTERNATIONALIS LIMNOLOGIAE (SIL) will hold its XIX Congress in Winnipeg during August 1974. If you would like information:

Roscoe W. Dalke
Congress Secretary
Freshwater Institute
Dept of the Environment
501 University Crescent
Winnipeg, Manitoba
CANADA R3T 2N6

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ITEMS OF GENERAL INTEREST

WALLACEANA, a new ecology newsletter, made its first appearance recently. The following is an abstract from the editorial.

"It is a newsletter designed to serve as a forum for promoting informal contact and communication between and amongst ecologists involved in and working on the South East Asian region. This forum is for all ecologists regardless of their environmental, biological or mathematical inclinations. It is designed to bring together ecologists from different countries in South East Asia and overseas, who have hitherto worked independently on environmental problems in the region. Through informal contact and communication, this forum could promote an awareness of, and a dialogue on research and action on, ecological issues in the region. In short, this forum is designed to promote the development of ecology as a science in South East Asia, especially, to seek a scientific rationale for exploiting and managing the natural and human resources, and for developing the social and economic status, of countries constituting this region.

With these objectives in view, this newsletter shall contain (a) a register of ecologists involved in South East Asia with an indication of their position(s), correspondence address(es), and ecological interest(s); (2) notices of meetings and conferences of an ecological nature; (3) information on publications and reports relevant to the ecology of the region; and (4) comments, notes and views of ecologists on regional or general ecological issues. This newsletter will be compiled and distributed for a trial period of three years. It is hoped, therefore, that ecologists in the region will utilise it to inform others of their activities, of environmental problems in their own country, of their views on general and regional ecological issues, of their needs and aspirations arising from their involvement in ecological work, and of ecological news that may be of interest to others in the region."

Ecologists who are not in the register, and who wish to receive Wallaceana (free of charge), should notify;

Dr J.I. Furtado
Division of Ecology
School of Biological Sciences
University of Malaya
Kuala Lumpur
MALAYSIA

giving particulars of position, address, and interests.

(-Ed.)

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ALBURY-WODONGA ECOLOGICAL SURVEY

In connection with the proposed development of Albury-Wodonga, the Cities Commission in October appointed Gutteridge, Haskins, and Davey Pty. Ltd. (Consulting Engineers) to prepare a strategic plan for the supply of water and sewerage services to the city and for the control and development of the River Murray and its flood-plain to maintain and enhance the environment. The area of direct interest is the river between Lake Hume and the weir at Yarrawonga (Lake Mulwala).

An ecological survey of the river in this area is being carried out by ROGER CROOME, a biologist employed by GHD, with assistance from PETER TYLER (Botany, U. Tas.), BILL WILLIAMS (Zoology, Monash), and KEITH WALKER (Env. Biol., ANU). Expert assistance is also being contributed by H.B.N. HYNES (U. Waterloo, Canada), C.N. SAWYER (USA), and J.S. ALABASTER (Water Pollution Research Lab., UK Dept of the Environment).

The study involves sampling at about 15 stations along the Murray, and at Lake Hume, Lake Mulwala, and on the Mitta Mitta, Ovens, and Kiewa Rivers. Tests carried out include measurements of physical and chemical parameters, including pesticides, herbicides, and surfactants. Biological observations include carbon-14 productivity and chlorophyll measurements, and surveys of the composition of plankton, benthos, fish, waterfowl, and macrophyte communities. The initial phase of the study terminates in July, but it is hoped that at least some parts of the work will continue.

(-Ed.)

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POLLUTION PROBLEMS OF THE RIVER MURRAY

A seminar with this title was held in December at Wentworth, NSW, under the auspices of the NSW Department of Decentralisation and Development. The meeting, which ran over three days, was highly successful and brought together a wide cross-section of people, although mainly from within the Public Service. Oddly enough, Mildura turned on a brief pollution scare to coincide with the meeting; locals were advised not to drink the town water (from the Murray) without boiling it for five minutes beforehand!

ASL members at the seminar were IAN BAYLY (representing the Australian Conservation Foundation), DON BUCKMASTER (from Fisheries and Wildlife, V), DON McMICHAEL (from the Commonwealth Department of the Environment and Conservation, and the River Murray Commission), JOAN POWLING (from State Rivers and Water Supply Commission, V), and KEITH WALKER (in connection with the Albury-Wodonga Ecological Survey). Buckshot was also seen to sign up several new ASL members.

Section A of the seminar dealt with engineering and hydrological aspects; the operating role of the River Murray Commission was outlined (K.E. JOHNSON), and the various operational difficulties in the Lower Murray region were described (J.S. GERNY). Section B, dealing with land use, included consideration of soil erosion problems (F.R. HIGGINSON), and the relations between aquatic weeds, herbicide use, and water quality (K.H. BOWMER). The contentious

issue of salinity and its agricultural implications (S. PELS, M.R. TILL) were surveyed in section C. Section D, on Wildlife, Fisheries, and Recreation, looked at fishes of the Murray (N.J. MACKAY), and the effects of pollution on wildlife (A.D. BUTCHER). The seminar concluded with section E, an examination of effluent disposal methods and water quality (F.C. SPELDEWINDE). Several contributed papers were read, including one on pollution by boats (A.E. FORD), and other material was available for distribution, including some notes on management problems connected with the river red gum (Eucalyptus camaldulensis). The full proceedings are to be bound and made available sometime this year.

Perhaps the most significant point to emerge from discussions during the meeting was the very obvious need for a comprehensive plan of management of the Murray Valley. Australia clearly cannot afford to allow deterioration of the river to proceed further; the Murray-Darling system drains about a seventh of the continent, including the nation's best agricultural land, and the economic and ecological implications of continuing destruction should be clear to everyone. The River Murray Commission has an outdated charter and limited powers; the need is for a Murray Valley Authority wherein all executive matters and decisions affecting the river are centralised.

It is equally apparent, however, that the prospects for such an Authority are very dim. The states, with their many different administrative branches, each having a stake in the river, are reluctant to cooperate and, constitutionally, the Federal Government has no power in this situation.

The virtues of having a single Authority were expounded by DON McMICHAEL in his dinner address to the seminar, in his capacity as a member of the River Murray Commission. Don's introduction was to relate the following story:

> It seems that Moses (a name not without special significance for Don!), in the time he was leading the Israelites to the Promised Land, came upon the Red Sea, apparently an insurmountable barrier to the travellers. Moses prayed to the Lord for assistance, and the Lord spoke to Moses, saying: "Moses, I have some good news and some bad news. First, the good news: I will part the waters of the sea, and you may all walk safely to the far shore." At this there was much rejoicing among the gathered people, but Moses was uneasy: "And the bad news?" "The bad news, Moses, is that first I will require an Environmental Impact Statement!"
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> (-Ed.)

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THE MURRAY VALLEY AND THE SOUTH AUSTRALIAN ENVIRONMENT

The University of Adelaide Summer School of Environmental Studies for 1974 was held at Goolwa, SA, at the mouth of the River Murray, during 7-18 January. Unfortunately, notice of the meeting came too late to notify ASL members through the pages of the Newsletter, but this should be rectified in subsequent years. The Summer School this year was attended by about 50 people, including 34 enrolled students, with many representatives from various professional groups. The atmosphere for the meeting was informal, and the surroundings contributed an ideal venue in which to consider the River Murray from a variety of different standpoints.

The first day of the School was devoted to exercises in group functioning and cooperation in environmental problem solving (J.D. KAYE), and a general appreciation of the role of the Murray in the South Australian environment. Geologic and geographic aspects (B. DAILY, R. THOMPSON, C. HARRIS) were considered on the second day. The third day was spent discussing the ecology of the river, with special reference being made to the ecological effects of man (K.F. WALKER). Subsequent days were devoted to prehistory and ethnography (N.B. TINDALE, L. RANKINE), and a one-day field trip to Lake Albert and Point McLeay Aboriginal Station. Two further days were spent in consideration of man's relationship with the river: irrigation and water supply (H.L. BEANEY), the history of riverboat traffic (I. MUDIE), politics and law (S.D. CLARK), and the role of the environmental impact statement (P.S. DAVIS). The final days of the Summer School were taken up by a cruise up to Morgan and return on the paddle-steamer MV Coonawarra.

The Summer School is a fine example of the fruitful communication that may be achieved between the concerned public and those professionally concerned with environmental issues. For anyone wishing information on future Summer Schools:

Dr Peter S. Davis
Director, Summer School of
Environmental Studies
Dept of Medicine, Univ of Adelaide
Royal Adelaide Hospital
ADELAIDE, SA 5000

At the conclusion of the fortnight, students at the School made the following detailed recommendations: (-Ed.)

1. THE MURRAY-DARLING SYSTEM AS A NATIONAL RESOURCE

We recommend that:

1. The Australian Government be requested to establish a National Resources Planning Authority whose principal task would be to ensure the rational and best use of the Nation's resources for its people. When established, this Authority would define national resource policies and co-ordinate relevant actions throughout Australia.

2.a. As a matter of urgency the Australian and State Governments be requested to extend the powers of the River Murray Commission to include the Murray-Darling catchment, and to reflect these changes, it be renamed the Murray-Darling Basin Commission.

b. The responsibilities of the Commission should include the management, development, and conservation of all resources within the Basin, including quality and quantity of water, soil, forests, recreation-resources, fisheries, and wildlife.

c. By mutual agreement between the various Governments, full-time commissioners and permanent staff be appointed.

d. As a matter of priority, the Murray-Darling Basin Commission examine the area within its jurisdiction and, in consultation with the Australian Government and the State Governments of Queensland, New South Wales, Victoria and South Australia, and other authorities and organisations, prepare a plan and programme for the rational use of the Basin's resources.

e. That the Murray-Darling Basin Commission be vested with the following powers:

i. to make recommendations regarding the construction and operation of works, according to agreed policy in any of the States within the Basin;

ii. To establish uniform standards of resource management throughout the Basin, to include such matters as water allocations and the regulation of river-flow, salinity, discharge of pollutants, fisheries, wildlife conservation, recreation-resources, and forest management; where appropriate, these standards to be established throughout the Basin by the respective Governments; the Commission to have the power to administer these laws, including the power of prosecution where necessary; the Commission to have the power to assist and advise resource-users to adhere to these standards;

iii. to conduct investigation and research in any matter considered appropriate.

3. The role played by independent voluntary organisations such as the Murray Valley Development League, and the Murrumbidgee Water Users Association in determining the views of the people and in promoting these to the relevant authorities, be supported and encouraged.

4. The Simon Pels scheme to carry fresh water in a concrete channel and to discharge polluted and saline waters into the River Murray, be rejected on environmental grounds.

2. THE MURRAY VALLEY IN SOUTH AUSTRALIA

Summary

A balance should be obtained between man's use of the river and the ecological system. In order to obtain the balance, extensive reserves have been recommended, also control measures.

It is considered that the general public should be made aware of the history, geography and ecology of the river, and of our reliance on this resource. We consider this awareness should be aroused by an intensive educational programme through all available channels, at the same time emphasising the responsibility of each individual to maintain the balance as far as possible.

The Present Environment

At present, the general public are forbidden access to extensive areas of river-frontage by alienation of land for shacks, land leased from Crown, and privately owned land.

Weirs on the river meet man's purpose of water-storage and irrigation. The ponding of water, however, has caused perennial flooding of what were formerly occasionally inundated flood plains. This has led to the drowning of forests of River Red Gums, also the destruction of the habitat of many species of native flora and fauna. Uncontrolled grazing and agriculture on newly created flood plains have presented the regeneration of the natural ecosystem.

Man's activities on the river or adjacent to it have in many cases been short-sighted. Shacks for a few people are built at pool level of the river, and in times of high flow are flooded. Associated with shack-building are the following disadvantages:

(a) Clearance of land;
(b) Effluent discharge into the river;
(c) Uncontrolled power-boats (e.g. speed boats)
(d) Pollution (e.g. litter and noise);
(e) Haphazard development that has caused multiplication of landing stages, roads, domestic water supply, public utilities, and disposal of sewage and garbage.

Flammable fluids are frequently stored adjacent to the river for boats to refuel. In many cases these fuels are stored in elevated tanks that at times of high flow, may collapse or fracture, releasing dangerous chemicals.

The normal method of storage of flammable fuels below ground adjacent to the river may seem unacceptable, but the alternatives are less desirable. For example, the location of bulk supplies some distance from the river would encourage boat-owners to transport the fuel in containers, whoch could result in greater spillage.

In townships and other areas hazardous chemicals (e.g. Dieldrin and Kerosene) are often carelessly stored. These, too, need control of a more stringent nature.

Numerous power-boats pollute the environment with noise and exhaust emission containing carbon monoxide, and, in many cases, oil. The noise created by certain craft not only disturbs the quality of life in communities, but also has an incalculable detrimental effect on the fauna. Oil-slicks were visible.

Some boat-drivers derive pleasure from exhibitionistic behaviour and endanger the lives of others. The wake created by fast vessels invades the habitat of fauna, causes increased erosion, and creates unpleasant conditions for fishermen and swimmers. The speed of power-boats not generally being limited, this nuisance can occur almost throughout the entire length of the river.

More people should be made aware of the vulnerability of the river, which is an incalculably valuable resource. This would help to prevent further despoilation of the environs. Up until now, large numbers of tourists and school children have been encouraged to remove geological specimens, artifacts, and native flora and fauna. Historical features such as aboriginal shelters and middens have been indiscriminately desecrated and fossil deposits have, in some cases, been irretrievably damaged.

Recommendations

1. A river reserve should be created within boundaries 100 m horizontally beyond the 1956 flood level or at points 1 m vertically above that flood level, whichever is the greater horizontal distance.

   Possible exemptions to the proposed reserve are

   (a) existing township areas
   (b) existing irrigation areas
   (c) existing established crop areas.

   The South Australian Government should be urged to seek the attainment of the river bank reserve project within a period of fifteen years.

2. On the river reserve, permission should not be granted for

   (a) a new building construction
   (b) new agricultural or irrigation developments
   (c) extension of township boundaries.

3. A study should be undertaken to determine the most appropriate locations for extensive conservation reserves outside the river reserve.

4. The reserves should be under the control of an appropriate Government Department.

5. In future, shacks should be built in cluster communities, not in ribbon formation.

6. Shacks at present in existence within the river reserve should be relocated.

7. Research should be undertaken to determine the location, land use, and size of allotments for shack communities.

8. The South Australian Government might provide shacks for casual users at reasonable rentals.

9. Except for shack cluster communities allotments within two kilometres of river reserves should be no smaller than 78 hectares.

10. Current regulations regarding navigation and safety should be enforced.

11. The number of water-craft using the river should be controlled.

12. Limited areas should be set aside for

    (a) bathing - where boats should be limited to 5 knots
    (b) boating areas where boats may exceed 10 knots
    (c) fishing.

13. Special refuelling bays should be created for water-craft.

14. All flammable liquid fuels within the river reserve should be stored below ground in sealed tanks.

15. No hazardous materials should be stored within the prescribed river reserve (including township areas) unless stored in water-tight containers.

16. Investigations should be carried out on methods of pollution control for outboard and inboard motors (viz. exhaust emission and noise).

17. Substantial fines should be imposed for littering.

18. Rangers should be appointed to patrol reserves, being vested with the following powers

    (a) enforcement of litter regulations
    (b) enforcement of navigation and safety regulations
    (c) enforcement of water-craft speed restrictions.

19. The new Act proposed by the South Australian Government pertaining to seqage disposal by river-craft and shacks should be implemented as soon as practicable.

20. Caravan parks and camping areas should be provided in conformation with future shack communities.

21. The preservation of important historical buildings and sites should be considered by the appropriate authorities.

22. Education of all sectors of the public with regard to the conservation of the River Murray Valley environs should be increased.

3. THE MURRAY-DARLING WATERWAYS AS AN INTEGRAL PART OF A NATIONAL TRANSPORT SYSTEM.

We recommend that investigations be carried out to determine the feasibility of re-establishing the Murray-Darling system as a navigable waterway, to be a major component of an integrated national transport system.

In overseas countries, notably Great Britain and the U.S.A., serious consideration is being given to restoration of canal and river transport systems because they have significant economic advantages over road and rail transport systems. The same advantages could apply to the Murray-Darling system, a great natural highway once navigable over 4,000 miles, now unused.

Road transport is severe on natural resources, both for fuel and road formation materials, while maintenance costs for highways subjected to constant use by heavy transports are rising alarmingly. Conveyance of heavy cargo is much more economical by water, and the rivers system provides a travelling surface which never needs patching.

The incorporation of the Murray-Darling waterways into an integrated river/road/rail transport system would foster decentralisation of industry and population to a vast area of inland Australia.

Subject to adequate pollution controls, the re-establishment of the navigable rivers system could bring significant benefits to the nation through economies in transportation, conservation of natural resources and the social advantages of decentralisation.

We feel these advantages could outweigh the obviously high cost of re-establishing the river boat and barge system, and recommend that competent authorities be appointed to study all aspects of the incorporation of the inland waterways into a national transport system.

4. EFFECT OF MAN ON THE RIVER MURRAY FLOOD PLAIN

We recommend that the River Murray, its flood plain, and the ecology of these areas be regarded as a resource of the nation.

1. Population

Population of the River Murray and its environs be controlled in density and location to provide maximum benefits for the present Australian community and future generations.

2. Industrial Development

Selection of industries, siting, and waste-disposal arrangements be investigated before granting any development licences in the River Murray area.

Existing industries be required to bring their waste-disposal to a nominated standard. Consideration to be given to re-location assistance for industries that cannot economically meet nominated standards.

3. Recreation

Trail-bikes, power-boats, and beach-buggies be used only in designated areas.

Recreational use of the River Murray area should be limited in amount and location to minimize adverse effects on the ecology or on the utilization of the river. All recreational use compatible with these aims to be allowed.

4. Restricted access to sensitive ecological areas.

5. Ribbon Development along the River Murray

Buildings to be restricted to certain areas to conform to nominated standards (e.g. 100 m back from 1956 flood line).

6. Agriculture

A re-assessment of the toxicity of potentially harmful substances used in agricultural practices (e.g. uncontrolled use of soluble fertilisers, chlorinated aromatics).

5. LAND AND WATER RESOURCE MANAGEMENT

We recommend, as guide-lines for land use along the river system, an efficient and responsible water diversion for the purposes of irrigation and water supply, based on observations made along the River Murray in South Australia.

Land Use

1. Institute Commonwealth and State "Land Use Zoning" legislation for the Murray and Environs to be administered by the State Government and local District Councils.

2. Zone 1 - from below normal pool level, kept dry because of man-made works - Potentially acceptable (P.A.) uses: fish-hatcheries, existing cash crop areas, existing specieal grazing, (e.g. as in Murray Bridge area), dairy grazing;
Not recommended (N.R.) uses: horticulture, structures, dumping, established grazing, mining.

Zone 2 - from normal pool level to maximum flood level -
P.A. uses: reserves, existing special grazing, existing cash crop areas, specific structures, e.g. public pumping stations such as at Murray Bridge and Swan Reach, plus private schemes such as Greenways Irrigation Scheme:
N.R. uses: horticulture, dumping, structures generally, mining, e.g. shacks all along the river, refuse and machinery collections (possibly private).

Zone 3 - cliff faces, cliff tops, and embankments above maximum flood levels -
P.A. uses: licenced easements, controlled structures, controlled afforestation;
N.R. uses: structures generally, dumping, mining, e.g. observed shacks at cliff-top level.

Zone 4 - adjacent surrounding plateau -
P.A. uses: structures generally, dry and irrigated horticulture and agriculture, afforestation, grazing and mixed farming, controlled mining;
N.R. uses: uncontrolled use of farm chemicals, lot feed farming, bad land management leading to despoilation.

Irrigation adjacent to the river

1. Immediately correct present practices that result in drainage problems and salinity problems.

2. Promptly investigate the economic efficiency of publicly owned or subsidised irrigation developments.

3. Market-research into the demand for various crops; a long-term programme.

4. Recommendations to be made for suitability of crops to related soil-types - both short-term and long-term.

5. Investigation of appropriate irrigation techniques:

   (a) the 'use pattern' of water should be considered, e.g. types of gardens, industrial complexes, domestic and industrial re-use of water, recreation and reclamation uses, etc.,
   (b) storage and re-cycling of stormwater and rainwater,
   (c) all water-rating systems for urban and rural uses
      i. payment for water consumed
      ii. review the present water tariffs, and determine whether a substantial tariff increase might not be in the best public interest
      iii. the present rating system with rebates as an inducement to conserve water,
   (d) if a revised rating system is not politically acceptable, politicians will be faced with the dilemma of social constrains versus economic constraints on quantitive use.

6. RESEARCH

Recommendations: There is an imperative need to add to the existing environmental data-bank. To aid in this the present limited formal research could be supplemented by guided voluntary research by individuals, groups, and organisations.

1. To facilitate the exchange of information, there should be an inventory of all known sources of information, such as individuals or voluntary groups who are experts in their fields.

2. There should be some established scientific methods of collecting and reporting information (i.e. complete details of time, place, conditions, etc.).

3. Use should be made of the resources of the existing systems both of Commonwealth and of State, such as
   (a) Education systems at all levels,[1]
   (b) Research departments of museums,
   (c) Libraries,
   (d) C.S.I.R.O. etc.

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[1] As an example for schools: a school in the Murray region could be encouraged to become interested in collecting information on the oil waste and spillage along the Murray; feed-back is essential.

MISCELLANEOUS ITEMS

A PUBLICATIONS LIST?

It might be valuable if the Newsletter included lists of papers (a) recently published, or (b) submitted for publication, and dealing with any aspect of Australasian limnology. If there is sufficient support for this suggestion, the list could begin in the next volume of the Newsletter. Please send the relevant information to me - on the back of a card, perhaps? (-Ed.)

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SOCIETAS INTERNATIONALIS LIMNOLOGIAE

SIL MEMBERS are reminded that annual subscriptions ($4.25, Sodalis; $8.50 Sodalis adjunctus) were due on 1 February. Please send you cheque (made out to SIL) to KEITH WALKER (Env. Biol., ANU) who is Acting Australian National Representative for the time BILL WILLIAMS (Zoology, Monash U.) is away overseas. (-Ed.)

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ERRATUM

In the last issue of the Newsletter, in the section referring to ALAN WEATHERLEY'S departure for Norway, the German warship referred to should have been the Tirpitz, not the Bismark. So there, Charles!

(-Ed.)

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BOOK REVIEW

JERVONS, F.R. 1972. Science Observed. Science as a Social and Intellectual Activity. (George Allen and Unwin Ltd.,: London.) 186 p.

The book contains 7 chapters (124 pages) of original text followed by 12 appendices (58 pages). The latter consist of short extracts from the writings of a number of respected 'meta-scientists' and from the report of several committees.

The author addresses himself 'to those who start by knowing little or nothing about the material and who do not want in the first instance to spend a great deal of time finding out about it'. (Indication of this intention in the title may have avoided possible disappointment on the part of some readers.) There are three main sections to the book. Chapters 1 to 4, with appendices 1 to 4, examine how science works; chapters 5 and 6 with appendices 5 to 11 discusses how scientists work, and the final chapter and appendix look at the future both of science and its practitioners.

In the first section, Chapter 1 shows how science, and the scientist, affects and is affected by the rest of society. Chapter 2 is an excellent introduction to the ways by which the practice of science can be observed and the problems of quantifying those observations. The methodology of science and the ways in which scientific knowledge is advanced, are examined in chapters 3 and 4.

The next two chapters turn attention from science to scientists, their motivation and deployment. A distinction is made between internal and external factors impinging on the practice of science; Jervons analyses this fundamental distinction with the clarity and economy exhibited in the earlier chapters. Some of the discussion, however, is inconsistent with the framework developed earlier - it is sometimes difficult to see the scientists described in chapters 5 and 6 (e.g. p. 56) as practitioners of the science outlined in the first four chapters. In Table 1, chapter 5, for instance, everyone with a science or engineering degree and employed by government or industry (why are similarly qualified housewives excluded?) is considered to be engaged in 'science'. If the implied definition of science is broad enough to include the activities of (e.g.) an insecticide salesman (with a science degree), then many scholarly and objective pursuits including perhaps sociology, history, and even philosophy might also qualify. Much of the inconsistency might have been avoided by an attempt by the author at a concise definition of science (and/or scientist). Admittedly this is a tall order in the present state of the art, but a few words of proscription would provide a template against which to compare the varying views implied in the appendices.

Perhaps another reason for the inconsistency lies in differences

between the appendices discussed. Appendices 1 to 4 are quotes from people responding to 'internal' motivation. Much of the basis for chapters 5 and 6 is derived from the work of committees convened in Britain during the last decade to examine specific problems of scientist-utilization. These must be considered as externally motivated (by 'needs pull'). Data presented in chapter 5 infer that scientists from these two groups view their work differently. Perhaps these differences extend to their approach to the study of science - sociological, philosophical, historical, and/or scientific (c.f. pages 32-33) - and to their judgement of what is and what is not scientific.

Finally, by concentrating on the two extremes - private industry vs. academia, internal vs. external motivation, etc. - there is a dichotomy implied which does not exist for a large number of scientists. For example many researchers in such organization as CSIRO and departments of Fisheries and Agriculture could claim to be contributing both to 'scientific knowledge' and to the solution of practical problems.

The last chapter (7) examines the future of science using a very brief discussion of Ravetz's views, and ends with a cursory glance at the 'limits to growth' problem. The latter is the least satisfactory part of the book and does not do the preceding discussion justice. In view of the volume of literature on this controversial subject, such statements as 'Nuclear energy has now released us from dependence on fossil fuels ... ' and 'As for depletion of natural resources, the world has survived plenty of alarms in the past', require considerably more substantiation than they receive.

Over all the book should provide its intended readers, particularly students, with a good thumbnail sketch of the study of science. Because of its format it may also stimulate further reading by introducing the reader to an author whose views he finds particularly interesting. Finally, as a bonus, much of the text provides an object lesson in the concise yet readable presentation of a complicated and wide-ranging subject. (-T.J. Hillman).

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A review of the Bayly-Williams book "Inland waters and their ecology" is currently in preparation, and hopefully will be included in the next issue of the Newsletter. (-Ed.)

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MINUTES

Since a quorum was not attained for the Second Executive Committee meeting, formal minutes were not taken, and matters arising from it were dealt with in the third meeting. (-Ed.)

THIRD EXECUTIVE COMMITTEE MEETING

Arthur Rylah Institute for Environmental Research, 27.11.73.

1. Present. Dr. D.F. McMichael, President.
   Mr. D.E. Buckmaster, Sec./Treasurer.
   Dr. W.D. Williams
   Dr. J. Martin
   Miss J. Powling.

2. Apologies Dr. I.D. Hiscock
   Dr. D. Pollard
   Mr. M. Geddes

3. Minutes of Previous Meeting

   Read and confirmed.

4. Business arising

   (a) 1974 Congress - deferred.

   (b) Bank accounts - the Society's accounts will be rationalised in the near future. There will be three accounts - Jolly Award A/C., General Account, and the Publications A/C. The President and the Sec./Treasurer will be the only signatories, as required by the Constitution, and all accounts will be located at the one bank.

   (c) Directory - the difficulty of keeping a publication of this type up to date was noted, and it was resolved that a new edition should be produced after the 1974 Congress (recommendation for incoming committee).

   (d) New Members - it was resolved that names of all new members admitted to the Society should be included in the minutes. This will be done (appendix attached).

   (e) Annual Subs. - Sec./Treasurer to send reminder to unfinancial members, early in New Year.

   (f) Registration for post - Sec./Treasurer to follow up.

(g) Price of Bulletin back-numbers - it was resolved that the price of back numbers should remain at $2.50 each for members. Bulletins issue C.O.D. to libraries etc., will be priced at $5.00 each from now on.

(h) Explanatory Leaflet - Sustaining Membership - the President produced a prototype leaflet, which was discussed at some length. He will continue to develop an advanced format for final ratification early next year.

5. Correspondence

- correspondence received was tabled and noted.
- all items requiring attention have been dealt with.
- Sec./Treasurer undertook to forward all items of general interest to Dr. K. Walker for inclusion in the Newsletter.

6. Accounts for Payment - payment of the following accounts was authorised-

Bulleen Duplicating Service	Newsletter 11 (3)	$49.86
120 Reproductions	Stencil	3.75
Monash University	Bulletin No. 5	480.00
Chas. E. Tully	Bulletin No. 5	747.63

7. General Business

(a) Annual Congress

- this function will be a joint Congress, involving the ASL; AMSA, and A.S.F.B.
- the venue will be the Noosa Lakes Motor Inn, at Tewantin.
- it was agreed that the President (A.S.L.) and Dr. F.H. Talbot would develop a brcad programme outline for the congress.
- this outline would then be developed by a joint programme committee, constituted as follows:-

Dr. D.F. McMichael
Prof. J. Thompson
Dr. F.H. Talbot
Dr. A.J. Gilmour
Dr. I.A. Bayly
Mr. D. Buckmaster

- the President also undertook to develop an 'organisation committee', which would handle general arrangements for the Congress. This committee would be constituted as follows :-

Prof. J. Thompson, Chairman (A.M.S.A.)
M. Geddes)
B. McMahon) A.S.L.
C. McIvor)
G.T. Harrison)
Local Committee A.M.S.A.
R. McKay A.S.F.B.

- it was agreed that the congress programme might be arranged along the following lines

- Friday - arrival and registration
- Saturday - 'joint interest' day, with central Estuary theme
  - joint dinner in evening
- Sunday - separate A.G.M.'s in morning
  - joint excursion in afternoon
- Monday - to be decided

- it was also agreed that the 'programme committee' should explore the possibility of producing a joint publication to record the Congress proceedings.

(b) Jolly Award - Sec./Treasurer undertook to open separate bank account (interest bearing) to house donations from Dr. Jolly.

Only two nominations have been received, both of which have been forwarded to the Jolly Award selection committee.

(c) Distribution of Publications - see 4 (g).

8. Other Business

(a) Publication of Bulletin No. 6.

It was decided that, due to financial limitations, it would be impossible to produce another Bulletin until next year (1974/75) without jeopardising the Society's finances.
This decision to be relayed to the Society's Editorial Committee.

9. Next Meeting

- last week in Jan 74 or first week in February
- venue probably Melbourne.

D.E. BUCKMASTER
Hon. Sec./Treasurer
21.12.73.

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DRAFT MINUTES

FOURTH EXECUTIVE COMMITTEE MEETING

Arthur Rylah Institute for Environmental Research 22.1.74.

1. Present — Dr. D.F. McMichael
Mr. D.E. Buckmaster
Dr. J. Martin
Miss J. Powling

2. Apologies — Dr. I.D. Hiscock
Dr. D. Pollard
Dr. W.D. Williams

3. Minutes of 3rd Meeting

Read and confirmed.

4. Business arising

(a) Unfinancial members - Secretary/Treasurer will be sending reminder notices in the near future to all unfinancial members.

(b) Bulletin No. 6 - Secretary/Treasurer to give Dr. Hiscock an estimate of funds that will be available for publication of Bulletin 6.

(c) Prices of A.S.L. publications - it was resolved that the following prices should apply:-

Special Publication (Crustacean Key)	$ 1.25 ea.
Directory 1973/74	$ 0.50 ea.

(for distribution outside the Society and for second copies to members see addendum, last page.)

(d) Bank accounts - Secretary/Treasurer directed to finalise this matter before next committee meeting.

5. Correspondence - tabled and noted.

6. Accounts for payment - nil.

7. General Business

(a) Newsletter - it was resolved that the Secretary/Tresurer should in future forward draft minutes of Committee meetings direct to the Editor. Any corrections will be made by direct contact, and this should shorten delays in reporting business of the Committee to members.

(b) 1974 Joint Congress - a circular/questionnaire has been sent to all members of the three participating Societies
- the President reported that negotiations re travel arrangements would continue, and should become firm soon after replies to the questionnaire have been received.
- it was noted that an excursion in the form of a boat trip would occupy nearly a full day, and some re-arrangement of the programme (especially in relation to A.G.Ms) may be necessary if the boat excursion is included in the arrangements.

(c) Distribution of publications - the Secretary/Treasurer has recently circulated all libraries and other affiliated bodies that have been receiving the Society's publications, in an effort to rationalise the situation. The response to date has been good, and these bodies have been given the option either of subscription to Bulletin only at $5.00 per annum, or to all publications at current membership rate.
i.e. Bulletin, Newsletter, and Directory..

(d) Constitution - it was agreed that members should be reminded of the provisions of Clause 13, especially in relation to question of voting rights of student members. (note in Newsletter Vol. 2 No. 2).

(e) Explanatory leaflet (Membership etc.) - the format of the leaflet was finalised, and the President undertook to continue development of the leaflet, which should be available by the Congress date.

8. Other Business

(c) Customs Act - Dr. Martin drew attention to the fact that this Act has recently been amended, and that Ministerial approval is now required before insects can be exported from Australia.

He pointed out that the new procedures may prove burdensome to bona fide entomologists.

9. Next Meeting - March 29th, at the Rylah Institute.

D. E. BUCKMASTER,
Hon Secretary/Treasurer 31.1.1974

WE WELCOME THE FOLLOWING NEW MEMBERS

(APPENDIX TO MINUTES OF THE THIRD EXECUTIVE COMMITTEE MEETING, NOVEMBER 1973).

Dr Angela H.A. Bonsink
Tutor, Univ. of Queensland
Dept of Entomology
St. Lucia, Qld. 4067

Dr K.H. Bowmer
CSIRO Div. of Irrigation Research
Private Bag
Griffith, NSW 2680

Mr Harry R. Burton
Entomology Department
University of Queensland
St. Lucia, Qld. 4067

Mr Ian Carstairs
Old Langley Post Office
Langley, Vic. 3444

Miss Wendy Craik
Flat 3/71 Blamey Cres.
Campbell, ACT 2601

Mr Roger Croome
P O Box 471
Wodonga, Vic. 3690

Dr Laurel R. Fox
Dept Environmental Biology
ANU Box 475
Canberra City, ACT 2601

Mr U. Erich Friese
Curator of Fishes
Taronga Zoo
Sydney, NSW 2088

Mr William A.E. Graham
State Rivers & Water Supply Comm.
590 Orrong Road
Armadale, Vic. 3143

Mr J.T. Harding
C/- Environment Protection Authority
240 Victoria Pde.,
East Melbourne, Vic 3002

Mr Robert B. Humphries
Dept of Environmental Biology
ANU Box 475
Canberra City, ACT 2601

Mr Tom Johnson
Biologist
Inland Fisheries Research Station
P O Box 182
Narrandera, NSW 2700

Mrs V.M.B. Jones
Royal Botanic Gardens and National Herbarium
Department of Agriculture
Sydney, NSW 2000

Mr Pheroze J. Jungalwalla
12 Caithness Cres.
Glen Waverley, Vic 3150

Dr G R Kennedy
Lecturer in Biology, Dept of Biology
The Capricornia Instit. of Advanced Education
PMB 31 MS 76
Rockhampton, Qld 4700

Mr Richard Marchant
c/- Zoology Department
Monash University
Calyton, Vic 3168

Dr G A Prowse, OBE
C/- Department of Botany
University of Hawaii
3190 Maile Way
Honolulu, Hawaii. 96822

Mr John R. Merrick
School of Biological Sciences
University of Sydney
Sydney, NSW 2006

Miss Penelope B. Morison
C/- National Museum of Victoria
Russell Street
Melbourne,

Mrs P. Lesley Morrissy
W.A.M.R.L. P O Box 20
North Beach, WA 6020

Mr I. Raine
Biogeography & Geomorphology Dept
Research School of Pacific Studies
ANU, P O Box 4
Canberra, ACT 2600

Mr G. Ralston
C/- Balpool Station
Via Deniliquin, NSW 2710

Mr Michael T. Rowe
Khancoban Alpine Inn
Alpine Way
Khancoban, NSW 2642

Mr Lee Saunders
C/- Rural Chemical Industries P/L
"Bilbimbie" Harrisons Lane
Glenorie, NSW

Mrs C.L. Settle
13 Higgins Cresent
Ainslie, ACT 2600

Mr Karl Shearer
OIC Inland Fisheries Research Station
P O Box 182
Narrandera, NSW 2700

Mr D. Stevenson
Fisheries Branch
Department of Primary Industries
76-78 George Street
Brisbane, Qld 4000

Mr John C. Wingate
Technical Manager
Rural Chemical Industries P/L
"Bilbimbie" Harrisons Lane
Glenorie, NSW

LATE ADDITION TO DRAFT MINUTES, FOURTH EXECUTIVE COMMITTEE MEETING.

Refer 4. Business Arising

(c) Prices of ASL publications:

Special publication (crustacean key)	$1.25
Directory 1973/74	0.50
Extra copies, Directory	0.50
Backnumbers, Bulletin	2.50
Backnumbers, Newsletter	0.20
For Affiliated bodies and libraries	
Bulletin only (COD)	5.00 p.a.
Bulletin, Directory, and Newsletter (COD)	6.00 p.a.
Backnumbers, Bulletin	5.00 ea.
Backnumbers, Newsletter	0.20 ea.